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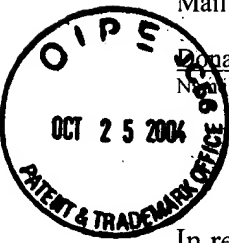
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: REZNEK, Steven R.	)	Examiner: Gentle E. WINTER
	)	
Application Number: 09/825,582	)	
	)	Group Art Unit: 1746
Filed: April 3, 2001	)	
	)	
Docket No.: 00141 (3600-345)	)	Confirmation No.: 9948

For: METHODS OF MAKING CARBON FOAMS

**REPLY TO EXAMINER'S ANSWER**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

October 25, 2004

Sir:

This Reply is in response to the Examiner's Answer dated August 26, 2004. This Reply (in triplicate) is being submitted within two (2) months of the date of the Examiner's Answer and therefore is timely. The Board of Patent Appeals and Interferences is respectfully requested to consider the following comments that are in direct response to the Examiner's Answer.

The Examiner's Answer in response to the Brief on Appeal necessitates several comments by the appellant.

1) At page 2, section (2), the Examiner asserts that the brief does not contain a statement identifying the related appeals and interferences. However, the Examiner is incorrect. At pages 1 and 2 of the Appellant's Brief on Appeal, section II, there is a clear statement that

indicates that the applicant is unaware of any appeal or interference which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal. Accordingly, the Examiner's statement is incorrect and needs to be corrected for the record.

2) With respect to the issues as set forth in section (6) of the Examiner's Answer, the Examiner has now, by way of the Examiner's Answer, withdrawn the rejection of claims 1, 2, 10, 12, and 21-28 in view of U.S. Patent No. 5,908,896 to Mayer et al. Furthermore, while the Examiner does not indicate this point, the rejection of claim 4 is moot and incorrect since claim 4 has been previously canceled during prosecution of this application.

3) a) At pages 2 and 3 of the Examiner's Answer, under section (7) of the grouping of claims, the Examiner asserts that all the claims stand or fall together because the appellant's brief does not include a statement that the grouping of claims do not stand or fall together and have not provided reasons to support the grouping. However, the Examiner is incorrect and the record needs to be corrected. First, at page 4 of the Appellant's Brief on Appeal, the appellant clearly argued a separate grouping of claims.

b) In particular, the appellant, in the Appellant's Brief on Appeal, at page 4, section VII, specifically states that claims 1, 3, 12, and 21 stand or fall together; claims 2 and 7-9 stand or fall together; claim 10 stands or falls on its own; claim 11 stands or falls on its own; claim 13 stands or falls on its own; claim 14 stands or falls on its own; claim 17 stands or falls on its own; claims 18-20 stand or fall together; claims 22 and 23 stand or fall together; and claims 24-29 stand or fall together. Furthermore, the Appellant's Brief on Appeal, at pages 7 and 12-21, provides the reasons why the above-mentioned claims or groups of claims are separately patentable. Throughout the entire Appellant's Brief on Appeal, separate arguments towards the

patentability of the separate grouping of claims has been presented. Furthermore, contrary to the Examiner's statements, 37 C.F.R. §1.192(c)(7) has been complied with. In particular, the appellant has provided a statement regarding which claims of the group do not stand or fall together and have provided numerous arguments why the claims of the group are believed to be separately patentable. Accordingly, the grouping of the claims as set forth in the Appellant's Brief on Appeal is proper.

4) At page 9 of the Examiner's Answer, the Examiner takes the position that simply because the carbon foams of the present invention preferably have high surface area as well as high structure, this must mean that activated carbon is the same as carbon foam. Unfortunately, the Examiner's reasoning is incorrect. As hopefully the Board should understand, many forms of particulate material have high surface area and high structure and needless to say, not all of these particulate materials are the same. For instance, carbon black can have very high surface area and high structure and certainly carbon black is not the same as activated carbon or carbon foam. Accordingly, simply because a material has high surface area, as well as high structure, does not mean that it is the same material. Furthermore, the Examiner's reliance on the definition for "activated carbon" does not state that this material would be carbon foam, and, in fact, shows the importance of steam or carbon dioxide to activated carbon, which forms the porous structure as the appellant has pointed out throughout the brief. Furthermore, it is noted that the definition relied upon by the Examiner at page 9 of the Examiner's Answer does not at all mention "pyrolysis;" a point that the Examiner seems to ignore. Accordingly, the appellant stands by the previous comments and arguments that activated carbon is not the same as carbon foam and the particular cited art, namely Ullmann, does not teach or suggest the claimed invention on appeal.

5) a) At the bottom of page 9 of the Examiner's Answer, the Examiner states that steam and carbon dioxide in Ullmann are mild oxidizing agents and that oxygen and air can be introduced to burn off gases. In response, the carbon dioxide and steam described in Ullmann are incapable of at least partially combusting the fuel, which is what the "oxidizing source" does in claim 1 during "pyrolizing." The entire language of claim 1 cannot be ignored. The purpose of the carbon dioxide and steam of Ullmann is very different from the oxidizing source of the claimed invention. The "oxidizing source" of the appealed claims burns with a fuel source, and the steam and carbon dioxide of Ullmann does not burn but expands to cause pores.

b) Further, at page 131, second column, Ullmann states that modern furnace construction allows for the introduction of oxygen and air at suitable points in the reactor to burn off the generated carbon monoxide and hydrogen gases that reduce the velocity of activation. The air and oxygen in Ullmann are introduced only at certain suitable points and only in amounts sufficient to burn the generated carbon monoxide and hydrogen gases and not to combust the original fuel. Again, it must be remembered that Ullmann, at the same page 131, states "[o]xygen or air are unsuitable as activating gases. In a mixture with steam or inert gas, small amounts of oxygen lead to activated material with very large pores. Oxygen reacts with carbon about 100 times as fast as carbon dioxide. This reaction velocity is even further increased by potassium salts, so that potassium-containing raw materials react so vigorously when oxygen is present in the gas that an uncontrolled combustion takes place without producing activation." (Emphasis added). As such, after reading Ullmann, one skilled in the art would be discouraged from using an oxidizing source, such as oxygen or air, to at least partially combust a fuel. Certainly, Ullmann does not teach any combustion of fuel with an oxidizing source.

6) With respect to the Examiner's comments at page 10 regarding the use of coal in Ullmann, the appellant needs to correct the record. First, page 4 of the present application does not warn against using an oxidizing source and the pyrolizable material at a certain temperature in order to avoid the material catching on fire. This particular statement is not present at page 4 of the present application and it is unclear where the Examiner obtained such a statement. Pyrolyzing involves combustion typically with "fire." The Examiner does not appear to fully understand "pyrolysis." For instance, the oxidizing source, e.g., air, burns with the fuel source. In other words, and to use the Examiner's terminology, a "fire" is created. Accordingly, the Examiner is unfortunately misreading and misunderstanding the present application. It is clear that the "oxidizing source" in the present application is a material that at least partially combusts the fuel and that the amount of oxidizing source should be controlled such that the pyrolizable material does not completely combust or burn the pyrolizable material. Unfortunately, the Examiner has misread page 4 of the present application and has assumed that no burning of the pyrolizable material occurs. The Examiner is incorrect. The present specification at page 4 states that one should not completely combust or burn the pyrolizable material. The word "completely" is an important term that provides the proper understanding to the sentence that the Examiner is apparently referring to.

7) Furthermore, the Examiner's reliance on Ullmann showing an oxidizing source, namely air or oxygen, has been addressed above. Clearly, Ullmann is not using any air or oxygen in a pyrolyzed reaction to partially combust the fuel, as recited in the claims.

8) In addition, the Examiner is incorrect with respect to saying that the off gas of the starting material is what is oxidized. Unfortunately, it appears the Examiner is confusing the

term "oxidize" with the term "oxidizing source" as used in the present application. The oxidizing source, as used in the present application, clearly is used to at least partially combust the fuel. This is not the case in Ullmann.

9) At page 10 of the Examiner's Answer, the Examiner states that claim 1 does not require the oxidizing source to be capable of combusting the fuel. Again, claim 1 in its entirety must be read. Claim 1 clearly recites a pyrolizing reaction unlike Ullmann. Furthermore, claim 1 specifically states "pyrolizing a mixture comprising at least one pyrolizable material in the presence of at least one oxidizing source and optionally at least one fuel source . . ." Clearly, claim 1 is reciting the pyrolizing mixture which contains the oxidizing source and the pyrolizable material. Further, as set forth in the specification, clearly the oxidizing source is present to combust the fuel and/or the pyrolizable material (especially if the pyrolizable material is also serving as the fuel as is an option in claim 1). Thus, the Examiner's interpretation and understanding of claim 1 is incorrect. As stated, Ullmann does not relate to pyrolizing and does not pyrolize to form any carbon foam. According to page 4 of the present specification, the oxidizing source should be sufficient to at least partially combust the fuel. Furthermore, although Ullmann briefly states that small amounts of oxygen in a mixture with steam or inert gas lead to activated material with very large pores, the paragraph as a whole states that oxygen and air are unsuitable as activating gases and, as the Examiner acknowledges, the use of oxygen and/or air is dangerous. Therefore, by reading Ullmann, one skilled in the art would not use oxygen or air as an activation gas. Ullmann clearly does not want the activating gas to combust with the coal.

10) At the top of page 11 of the Office Action, the Examiner appears confused over appellant's technical arguments and asserts that the Examiner has never heard of the term

"oxygen rich" pyrolysis. This term is quite known to those in the technology area of forming carbon particulate materials such as carbon black. See, for instance, U.S. Patent No. 4,460,558, column 5, lines 10-17.

11) At page 11, the Examiner refers to page 4 of the present application and compares this statement to the statement in Ullmann regarding steam and carbon dioxide. Again, in response, the Examiner is confusing various statements. First, as stated in the Brief on Appeal, Ullmann specifically uses steam and carbon dioxide to form pores, and the Examiner has specifically asserted that these two components would be the oxidizing source for purposes of concluding that Ullmann anticipates the claimed invention. In response, the appellant rightfully pointed out that steam and carbon dioxide are not oxidizing sources as used in the present application and in claim 1 since an oxidizing source is used in a pyrolysis reaction and serves to combust the fuel. Further, the applicant points out that steam and carbon dioxide cannot serve as an "oxidizing source" in claim 1 for this reason since they do not combust fuel. The Examiner's attempt to then assert that the present application at page 4 warns against the use of an oxidizing source is incorrect. As stated above, the present specification at page 4, makes no such statement. The present specification simply states at the bottom of page 4 that the oxidizing source should be "sufficient to at least partially combust the fuel, but the amount of oxidizing source should be controlled such that the pyrolizable material does not completely combust or burn the pyrolizable material." (Emphasis added.) Thus, the Examiner is again unfortunately mis-reading the present application and making an improper comparison of two very different processes. It is clear that the oxidizing source in the present application combusts the fuel, which is not the case in Ullmann -- a point that the Examiner does not seem to dispute.

12) At page 11 of the Examiner's Answer, the Examiner states that the appellant's reason for stating "the steam and carbon dioxide would hinder or prevent any pyrolizing" is unclear. In response, both steam and carbon dioxide are noncombustible (*see* Hawley's Condensed Chemical Dictionary, 7<sup>th</sup> edition). In order to pyrolize a pyrolizable material, a fuel is at least partially combusted. As steam and carbon dioxide are non-combustible gases, they are incapable of combusting a fuel. Furthermore, Ullmann does not teach or suggest adding at least one separate fuel source other than the pyrolizable material.

13) Furthermore, in response to the Examiner's argument that Ullmann does not use the "magic word 'pyrolize' " (see bottom of page 11 of Examiner's Answer) this is an attempt to trivialize the differences between Ullmann and the claimed application on appeal. Ullmann does not use the term "pyrolized" because it does not relate to pyrolizing a material. Second, this is not a simple matter of a difference in words. The words mean something, and clearly the pyrolizing of the mixture containing the pyrolizable material in the presence of at least one oxidizing source and optionally at least one fuel source as recited in claim 1 to form a carbon foam is not shown either in words or figures in Ullmann. As clearly shown by the appellant, Ullmann does not teach each and every step of claim 1. The Examiner's attempt to argue that "preoxidation step" is the same as "pyrolizing" is a clear misunderstanding of the technology. The two terms are completely different and are not used interchangeably. If these terms were used interchangeably, the Examiner should have provided a reference showing the interchangeability of the two terms. However, since the Examiner has failed to do so, the Examiner's attempt to make this argument is clearly not supported and is only the Examiner's own unsupported opinion, which is not sufficient to formulate a prior art rejection.



14) In response to the appellant's argument with respect to claims 2 and 7-9, the Examiner asserts at page 12 of the Examiner's Answer that page 128 of Ullmann describes the addition of the fuel as a "pretreatment step." The Examiner then states that the appellant's method is a pretreatment step. However, the Examiner provides no explanation for the statement. Ullmann simply does not teach or suggest pyrolyzing a mixture of at least one pyrolyzable material, at least one oxidizing source, and at least one fuel source other than the pyrolyzable material.

15) With respect to the Examiner's Answer at page 12 that Ullmann, at page 131, second column, describes air and oxygen as a means to burn the injected fuel or the locally produced fuel, the Examiner is misreading Ullmann. As stated earlier, Ullmann, at page 131, states that oxygen and air may only be introduced into the furnace to burn off the produced carbon monoxide and hydrogen, both of which reduce the velocity of the activation. The oxygen and the air at page 131 are not used to burn the original fuel. Furthermore, by reading Ullmann, one skilled in the art would not introduce oxygen or air into the furnace because oxygen and air create an uncontrollable reaction.

16) At page 12 of the Examiner's Answer, the Examiner asserts that page 131 of Ullmann teaches the presence of oxygen and/or air in the carbon activation process. The Examiner then refers to Fig. 21, which illustrates carbon, oxygen, and hydrogen contents present in bituminous coals. The Examiner seems to infer that the oxygen and air described at page 131 of Ullmann are present in a concentration of from about 0.5% to about 0.75%. Claim 11 clearly recites the presence of an oxidizing material that is separate from the pyrolyzable material. Furthermore, when a fuel is present, claim 11 recites that the fuel source is separate from the

pyrolizable material, as well as the oxidizing material. Therefore, the oxygen in the actual chemical makeup of the coal in Ullmann does not support the presence of a separate oxidizing material. Again, the Examiner is arguing that the coal in Ullmann is a pyrolizable material and, at the same time, acts as the oxidizing material. As stated, claim 11 requires two separate components -- one that is pyrolizable material and one that is an oxidizing material. This is simply not shown by Ullmann. Further, the oxygen or air concentration of 0.5% to 0.75% shown in Fig. 21 relates to the concentration of oxygen present in the actual chemical makeup of the coal. Ullmann does not provide the concentration of the oxygen and air described at page 131. The Examiner cannot substitute the oxygen concentration present in the coal for the concentration of the air or oxygen mentioned at page 131 of Ullmann.

17) With respect to claim 14, at page 13 of the Examiner's Answer, the Examiner asserts that oxidizers (carbon dioxide and steam) are introduced with the pyrolizable material. However, as stated earlier, carbon dioxide and steam are not "at least one oxidizing source" as recited in the claimed invention. The "at least one oxidizing source" of the claimed invention (e.g., oxygen and/or air) is capable of combusting the fuel. Neither carbon dioxide nor steam is capable of at least partially combusting the fuel. In fact, steam and carbon dioxide are needed to produce pores/cracks. Claim 11, which is dependent on claim 1, clearly recites that the oxidizing material is present in a certain amount needed to combust the pyrolizable material and/or fuel. It is clear that the oxidizing material or oxidizing source is present in a pyrolysis reaction and combusts the pyrolizable material and fuel. Claim 11 makes this point quite clear. The materials of Ullmann, namely carbon dioxide and steam, do not anticipate such a reaction since they are incapable of combusting the fuel or pyrolizable material. In order to produce the fine pores or

cracks, the gases containing oxygen cannot be used to combust the fuel. The Examiner is misreading the claim.

18) With respect to the Examiner's comments at page 13 regarding the coal as a pyrolizable material, the Examiner continues with the same flawed argument. Namely, the Examiner is still asserting that the coal serves as the pyrolizable material as well as the fuel source. The fuel source and the pyrolizable material are two separate sources as recited in the claims. The Examiner has not shown any part of Ullmann which teaches or suggests the separate use of a pyrolizable material and the separate use of a fuel source. This is clearly a requirement, for instance, in claim 2 and in other claims.

19) With respect to the Examiner's argument that pyrolysis is the same as gas activation of a pyrolizable material, the applicant respectfully disagrees for the reasons provided above and in the Appeal Brief. Pyrolysis is not the same as gas activation. Gas activation merely involves forming pores in a material, whereas pyrolysis actually results in the incomplete combustion of a pyrolizable material generally in the presence of a fuel and an oxidizing source. This simply is not shown in Ullmann.

20) With respect to claim 17, the Examiner, at page 14 of the Examiner's Answer, asserts that Fig. 23 of Ullmann and the relevant associated text teach that steam, gas, and air are fed into the kiln, the ignition occurs within the kiln, and then the carbon is added to the hot kiln. The text of Ullmann simply does not teach the fuel source or oxidizing source being introduced into the combustion chamber prior to the introduction of the pyrolizable material. The text associated with Fig. 23 states that high temperatures are necessary for gas activation and that the kiln includes several burners and gas supply lines that are distributed along and around the kiln

casing. Additionally, Fig. 23 illustrates a rotary kiln for a steam activation process that includes a coal inlet, steam inlet, gas inlet, air inlet, brick lining, and lifters. The description of Fig. 23 as well as Fig. 23 itself do not teach or suggest first introducing the fuel source and the oxidizing source into the combustion chamber and then introducing at least one pyrolizable material.

21) With respect to claims 18-20, at page 14 of the Examiner's Answer, the Examiner asserts that according to Ullmann, a fluidized bed reactor can be used. The Examiner's reference at page 126 to pneumatic delivery relates to transporting the granules or pellets, wherein the granules/pellets must have adequate thermal and chemical resistance to withstand any severe temperature variations or aggressive environments, such as an oxidizing atmosphere. In all of these paragraphs of Ullmann, there is still no mention of dispersing the pyrolizable material in a carrier stream or that the carrier gas is a fuel source or an oxidizing source or both.

22) With respect to the Examiner's arguments concerning claims 22 and 23, the appellant stands by the previous comments. Clearly, the process of the claimed invention is quite different from Ullmann and the comments made in the Examiner's Answer further support these differences. Accordingly, the product made by the process of the claimed invention would indeed be different from the activated carbon of Ullmann.

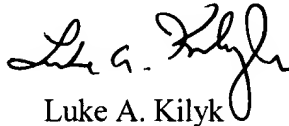
23) Furthermore, regarding claims 24-29, the appellant stands by the previous comments. Ullmann does not at all mention the formation of carbon foam, nor the formation of carbon foam having cells bordered by thin sheets, windows, or struts or combinations thereof. In addition, Ullmann does not teach or suggest any thermal insulating material or polymer compounds. Again, the appellant stands by the comments set forth in the Appeal Brief which has not been completely refuted by the Examiner.

**CONCLUSION**

Accordingly, for the reasons set forth in the Brief on Appeal filed on August 19, 2004 and additionally for the reasons set forth herein, it is respectfully submitted that the Examiner's rejections of the pending claims are in error and should be reversed.

If there are any additional fees due in connection with the filing of this Reply to Examiner's Answer, please charge the fee to Deposit Account No. 03-0060.

Respectfully submitted,



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